STATEMENT OF WORK FOR THE

DEMOLITION

AND

RECONSTRUCTION

OF

VACUUM LINES, EXHAUST DUCT

WORK, COMPRESSED AIR AND

NITROGEN FOR THE LPCVD

LOCATED IN B30-DDL

JOE SANTOS CODE 553.0 1/23/2012.

LIST OF ACRONYMS

ACRONYM	DEFINITION
COTR	Contracting Office Technical Representative
DDL	Detector Development Laboratory
GRC	Gas Reactor Column
LPCVD	Low Pressure Chemical Vapor Deposition
NASA/GSFC	National Aeronautic and Space Administration/ Goddard Space Flight Center
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers

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1. SCOPE

1.1 This statement of work is for the upgrade, installation, testing, inspection and performance to specifications to upgrade and complete the facilities described below for the LPCVD system, located in building 30 DDL. This work consists of the demolition and removal of three existing three inches vacuum lines, currently installed from the LPCVD system in the DDL clean room connected to the pumping stacks located in the lower level of the laboratory. After the demolition is complete the contractor will fabricate and install three new four inches vacuum lines starting at the LPCVD and terminate close to the pumping stacks. The vendor shall disconnect the twelve inches stainless steel exhaust duct work, fabricate and install an addition to extend the existing duct work, re-orient and reconnect the six inches branches that were removed to each of the GRC's. In addition the contractor must extend the pneumatic air supply and nitrogen supply to the new location of the pumps.
1.2 All work specified shall be in compliance with the codes and standards for mechanical work. The contractor shall provide all the labor, materials and services to construct, install, and test these systems.

2. CONSTRUCTION AND INSTALLATION

2.1 The vacuum lines shall be fabricated using 304L stainless steel seamless tube having the minimum wall thickness of 0.065". The finish shall be Ra 25.
2.2 The construction of the lines shall be orbital welded or be pre-fabricated and joined together using ISO 100mm claw clamps and O-rings.
2.3 The E-VAC lines shall be secured by spring hangers with a minimum 1" deflection where anchored to the ceiling.
2.4 A portion of the E-VAC line will be installed in the DDL clean room.
2.5 The work to be done in the clean room must follow the clean room protocols.
2.6 Refer to the sketches provided for details on the vacuum lines.
2.7 The exhaust duct shall be fabricated using welded stainless steel flanged at both ends.
2.8 The steel shall be a minimum of 20 gauge, joined by circular flanges and bolts.
2.9 The duct work joints shall be sealed using silicone gaskets.
2.10 The exhaust lines shall be secured by spring hangers with a minimum of 1" deflection where anchored to the ceiling and supporting collars at the duct work.
2.11 The extension of the air and nitrogen services shall be ½" cooper tubing brazed using flux free brazing rods or compression fittings.
2.12 One shutoff valve shall be installed on each of the service lines.
2.13 The service line shall be reconnected to the GRC's columns using existing regulators.
2.14 See provided sketches for clarifications; note that they are for information only and they are not drawn to scale.

3. TEST PROCEDURE

3.1 The gas delivery system shall successfully meet the following test criteria to be eligible for acceptance.

3.1.1 Test the vacuum lines by evacuating using a suitable vacuum leak detector. The end of the new line in the clean room shall be capped and the leak detector connected at the other end in the lower level. 3.1.2 Using the outboard method for helium detection, the helium leak rate shall not exceed $5.0x10^{e-7}$ Torr.l/s.
3.1.3 The compressed air and the nitrogen services shall test to one and half times the working pressures. The system shall be pressurized and a gauge with of one psi increments shall be used. After 24 hours the pressure shall remain the same as when the system was pressurized.
3.1.4 These tests must be performed in the presence of a Government employee or its designee.

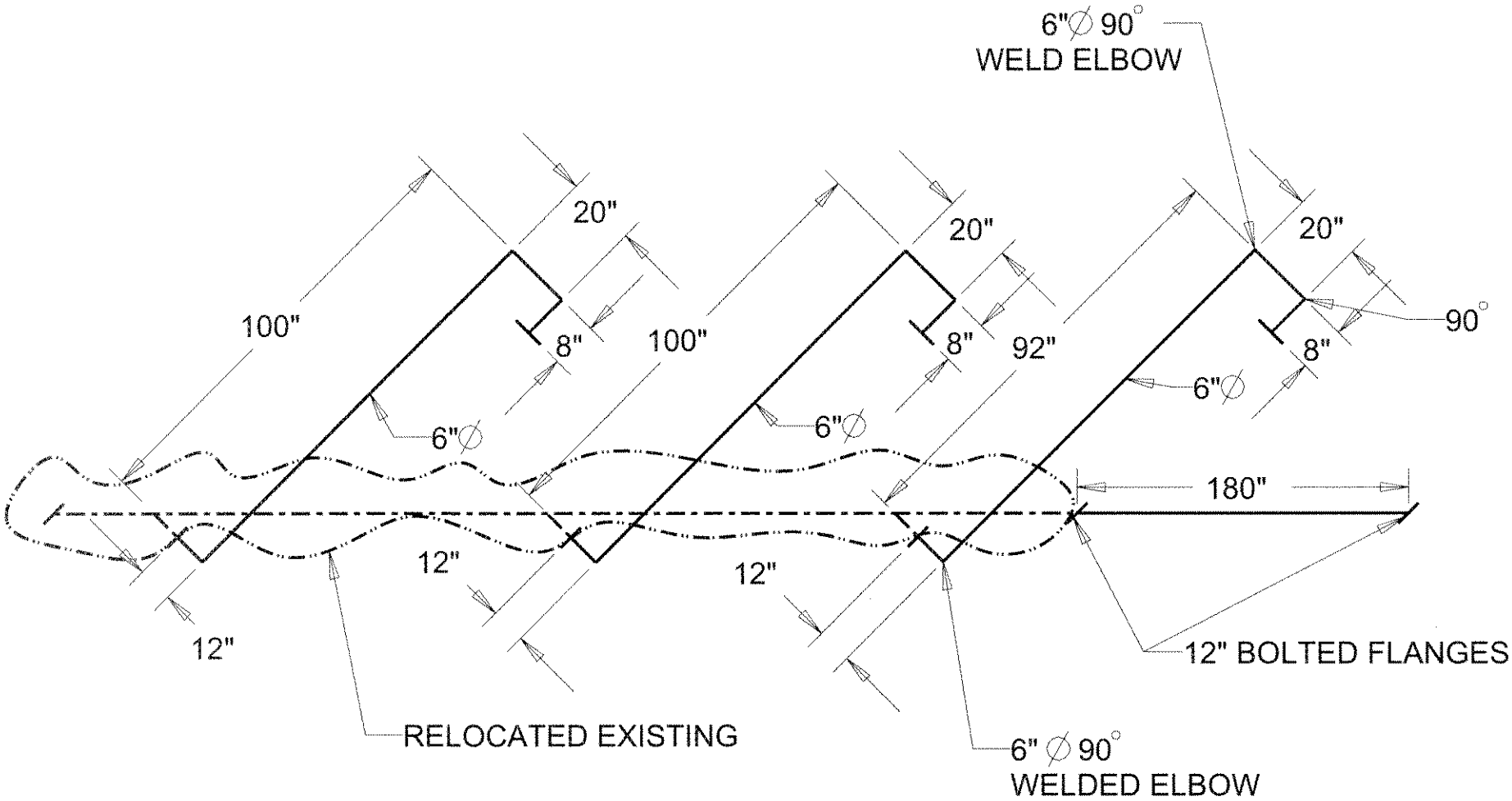
4. DELIVERABLES

4.1 The contractor shall provide documentation of all tests for all systems and verifications both successful and unsuccessful.
4.2 Provide two sets of as built design and shop drawings.
4.3 A parts list of materials and equipment to be installed in this contract shall be presented to the COTR for approval before commencement of work. Manufacturer's name and catalogues part numbers. Warranties of contractor supplied parts.
4.4 All welding and/or brazing shall meet ANSI/ASME B31.3 standard.
4.5 All personnel performing work shall be qualified according with their specific trade organization standard.

5.EXECUTION

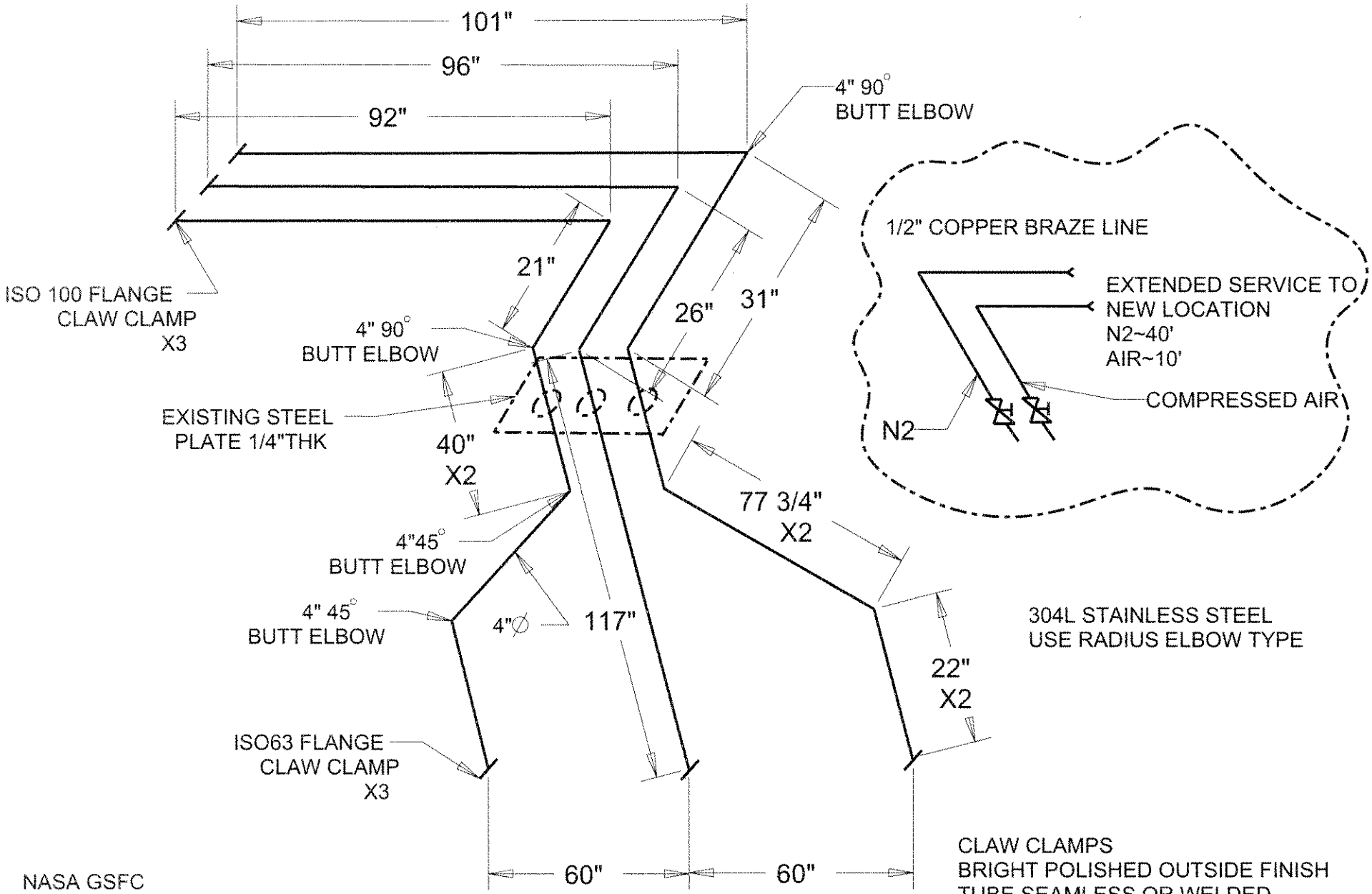
5.1 The piping routing design and installation shall make use of the existing waffle slab openings in the DDL.
5.2 The COTR reserves the right to witness all tests required in this statement of work.
5.3 The COTR should approve all stipulated tests.
5.4 All design work shall be approved by COTR before commencement of the installation.
5.5 Clean room protocols shall be followed when working in the class 10.000 or class 100 areas.

5.6 The procedures, training and clean rooms garments required for proper clean room protocol will be provided by the Government.
5.7 The System shall meet all applicable local, state, and federal codes.
5.8 The contractor must present a safety plan that conforms to GSFC safety requirements for contractors. The guiding document is Directive 553-PG-8715.1.1 which includes all operations in DDL. The contractor shall abide by the relevant sections defined by the COTR.



NASA GSFC
EXHAUST LINE
FOR LPCVD SYSTEM
IN BLDG 30 DDL
NOV 30, 2011

-STAINLESS STEEL SPOOL PIECE
-NEW WORK IN BOLD
-USE RADIUS ELBOW



NASA GSFC
E-VAC LINE
FOR LPVCD SYSTEM
DEC 2, 2011

CLAW CLAMPS
BRIGHT POLISHED OUTSIDE FINISH
TUBE SEAMLESS OR WELDED
WALL THICKNESS 0.065 MIN
304L SS TUBE
LONG RADIUS ELBOWS